

Abstract

Disclosed are the uses of specific genes of the mevalonate and isoprenoid biosynthetic pathways, and of inactive gene sites (the pseudogene) to (1) enhance biosynthesis of isopentenyl diphosphate, dimethylallyl diphosphate and isoprenoid pathway derived products in the plastids of transgenic plants and microalgae, (2) create novel antibiotic resistant transgenic plants and microalgae, and (3) create a novel selection system and/or targeting sites for mediating the insertion of genetic material into plant and microalgae plastids. The specific polynucleotides to be used, solely or in any combination thereof, are publicly available from GeneBank and contain open reading frames having sequences that upon expression will produce active proteins with the following enzyme activities: (a) acetoacetyl CoA thiolase (EC 2.3.1.9), (b) 3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) synthase (EC 4.1.3.5), (c) HMG-CoA reductase (EC 1.1.1.34), (d) mevalonate kinase (EC 2.7.1.36), (e) phosphomevalonate kinase (EC 2.7.4.2), (f) mevalonate diphosphate decarboxylase (EC 4.1.1.33), (g) isopentenyl diphosphate (IPP) isomerase (EC 5.3.3.2), and (h) phytoene synthase (EC 2.5.1.32).